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IS 5159 (1969): Mains-operated electric shavers [ETD 32: Electrical Appliances]



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IS : 5159 - 1969

*Indian Standard*

**SPECIFICATION FOR  
MAINS-OPERATED ELECTRIC SHAVERS**

( First Reprint JULY 1983 )

UDC 687.53.052-83



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**INDIAN STANDARDS INSTITUTION  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002**

**Gr 3**

*September 1969*

**AMENDMENT NO. 2    MAY 1989**  
**TO**  
**IS : 5159 - 1969 SPECIFICATION FOR**  
**MAINS-OPERATED ELECTRIC SHAVERS**

( Page 9, clause 10.3.11 ) — Substitute the following for the existing clause:

**'10.3.11 Endurance Test** — The shaver is operated at 1.1 times the rated voltage under conditions of normal load. It is operated for 100 cycles of 10 minutes ON and 50 minutes OFF under these conditions. It is then operated at 0.9 times the rated voltage for 100 cycles of 10 minutes ON and 50 minutes OFF under conditions of normal load.

**10.3.11.1** After this test, the shaver shall withstand electric strength test of 44.4 of IS : 302-1973.'

( ETDC 43 )

Printed at Printwell Printers, Delhi, India

# Indian Standard

## SPECIFICATION FOR MAINS-OPERATED ELECTRIC SHAVERS

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**IS: 5159 - 1969**

*( Continued from page 1 )*

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*Indian Standard*  
**SPECIFICATION FOR  
MAINS-OPERATED ELECTRIC SHAVERS**

**0. FOREWORD**

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 16 June 1969, after the draft finalized by the Electrical Appliances Sectional Committee had been approved by the Electrotechnical Division Council.

**0.2** This specification covers the electrical characteristics of mains-operated electric shaver. The general, safety and performance requirements specified in this standard ensure personal safety against electric shock, safety against the effect of excessive temperature and fire, and reliable operation.

**0.3** References to IS: 302-1967\* have been made in this standard with regard to general and safety requirements as well as methods of tests, which is a necessary adjunct to this standard. Should, however, any deviation exist between the requirements of IS: 302-1967\* and those of this standard, provisions of the latter shall apply.

**0.4** This standard is one of a series of Indian Standards on domestic electrical appliances.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS: 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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**1. SCOPE**

**1.1** This standard applies to mains-operated electric dry shavers designed for connection to supplies at voltage not exceeding 250 V ac or dc.

**2. TERMINOLOGY**

**2.0** For the purpose of this standard, the following definitions shall apply in addition to those specified in 2 of IS: 302-1967\*.

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\*General and safety requirements for light electrical appliances (third revision).

†Rules for rounding off numerical values (revised).



## **IS:5159-1969**

**2.1 Electric Shaver** — An electric appliance used for shaving which may or may not have a clipping device. It includes cables and connectors.

**2.2 Normal Load** — A short-time operation of 10 minutes idling with the cutting head in place, the shaver being freely suspended in still air by its flexible cord. If necessary, the connector may be prevented from pulling out by artificial means.

### **3. RATING**

**3.1 Rated Voltage** — The provisions of **3.1** of IS:302-1967\* shall apply.

### **4. MATERIAL**

**4.1** The provisions of **5** of IS:302-1967\* shall apply.

### **5. CONSTRUCTION**

**5.1** Relevant provisions of **7** of IS:302-1967\* in addition to those specified in **5.1.1**, **5.1.2** and **5.1.3** shall apply.

**5.1.1** Shavers shall be designed for double insulation to provide adequate protection against electrical hazards.

**5.1.2** Shavers shall be so designed as to prevent the penetration of clippings into places where they might give rise to electrical or mechanical faults. The collection chambers shall be easy to clean.

**5.1.3** It shall be easy to replace the cutters when they eventually lose their sharpness.

### **6. GENERAL AND SAFETY REQUIREMENTS**

**6.1 Protection Against Electric Shock** — Provisions of **8** of IS:302-1967\* shall apply.

**6.2 Temperature Limit** — The temperature limit specified in Table 1 of IS:302-1967\* shall apply.

**6.3 Electrical Insulation** — The provisions of **11** of IS:302-1967\* shall apply.

**6.4 Radio Interference Suppression** — The provisions of **7.11** of IS:302-1967\* shall apply.

**6.5 Moisture Resistance** — The provisions of **13** of IS:302-1967\* shall apply.

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\*General and safety requirements for light electrical appliances (*third revision*).

## AMENDMENT NO. 1      NOVEMBER 1975

TO

### IS : 5159-1969 SPECIFICATION FOR MAINS-OPERATED ELECTRIC SHAVERS

This amendment is being issued to make reference to IS : 302-1973 General and Safety Requirements for Household and Similar Electrical Appliances ( *Fourth Revision* ) in place of IS : 302-1967 General and Safety Requirements for Light Electrical Appliances ( *Third Revision* ).

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#### Alterations

( *Designation and title of IS : 302-1967* ) — Substitute ' IS : 302-1973 ' for ' IS : 302-1967 ' and ' General and safety requirements for household and similar electrical appliances ( *fourth revision* ) ' for ' General and safety requirements for light electrical appliances ( *third revision* ) ' wherever they appear in the standard.

( *Page 4, clause 4.1* ) — Substitute ' 7.11 and 7.12 of IS : 302-1973\* ' for ' 5 of IS : 302-1967\* '.

( *Page 4, clause 6.2, lines 1 and 2* ) — Substitute ' Table 3 of IS : 302-1973\* ' for ' Table 1 of IS : 302-1967\* '.

( *Page 4, clause 6.4, lines 1 and 2* ) — Substitute ' 7.34 of IS : 302-1973\* ' for ' 7.11 of IS : 302-1967\* '.

( *Page 7, Table 1* )

a) *Against Sl No. 5* — Substitute ' 44.3 of IS : 302-1973\* ' for ' 41.3 of IS : 302-1967\* '.

b) *Against Sl No. 8* — Substitute ' 43 of IS : 302-1973\* ' for ' 42 of IS : 302-1967\* '.

c) *Against Sl No. 15* — Substitute ' 35 of IS : 302-1973\* ' for ' 33 of IS : 302-1967\* '.

d) *Against Sl No. 1C* — Substitute ' 37 of IS : 302-1973\* ' for ' 35 of IS : 302-1967\* '.

[ *Page 7, clause 10.1.2 (c)* ] — Substitute ' 42.3 of IS : 302-1973\* ' for ' 41.1 of IS : 302-1967\* '.

[ *Page 7, clause 10.1.2 (d)* ] — Substitute ' 44.3 of IS : 302-1973\* ' for ' 41.3 of IS : 302-1967\* '.

[ *Page 7, clause 10.1.2 (g)* ] — Substitute ' 43 of IS : 302-1973\* ' for ' 42 of IS : 302-1967\* '.

[ Page 8, clause **10.1.3** (c) ] — Substitute ‘**42.3** of IS : 302-1973\*’ for ‘**41.1** of IS : 302-1967\*’.

[ Page 8, clause **10.1.3** (d) ] — Substitute ‘**44.3** of IS : 302-1973\*’ for ‘**41.3** of IS : 302-1967\*’.

( Page 9, clause **10.3.4**, line 2 ) — Substitute ‘**42.3** of IS : 302-1973\*’ for ‘**41.1** of IS : 302-1967\*’.

( Page 9, clause **10.3.5**, line 2 ) — Substitute ‘**40** of IS : 302-1973\*’ for ‘**38** of IS : 302-1967\*’.

( Page 9, clause **10.3.6**, line 2 ) — Substitute ‘**42.1** and **42.2** of IS : 302-1973\*’ for ‘**40** of IS : 302-1967\*’.

( Page 9, clause **10.3.8**, lines 1 and 2 ) — Substitute ‘**41** of IS : 302-1973\*’ for ‘**39** of IS : 302-1967\*’.

( Page 9, clause **10.3.9**, line 1 ) — Substitute ‘**36** of IS : 302-1973\*’ for ‘**34** of IS : 302-1967\*’.

( Page 9, clause **10.3.10** ) — Substitute the following for the existing clause:

‘**10.3.10 Abnormal Operation Test** — The test shall be performed in accordance with **47.7** to **47.9** of IS : 302-1973\*’ with the following modifications:

a) Tests under **47.8** do not apply.

b) In the test under **47.9** the lowest possible load shall be achieved by removing parts which can be removed without use of tools.’

( Page 9, clause **10.3.11**, last line ) — Substitute ‘**52.7** of IS : 302-1973\*’ for ‘**50.3** of IS : 302-1967\*’.

(ETDC 43)

**6.6 Mechanical Strength** — The provisions of **15** of IS:302-1967\* shall apply.

**6.7 Abnormal Operation** — The provisions of **16** of IS:302-1967\* shall apply.

**6.8 Operation Under Overload Condition** — The provisions of **18** of IS:302-1967\* shall apply.

## 6.9 Supply Connections

**6.9.1 Connecting Facilities Required** — The provisions of **20.1** of IS:302-1967\* shall apply.

The flexible cord may be attached by soldering or by crimped connections. If a plug is provided on supply cord, it shall be a moulded-on plug and if a connector is provided, it shall be a moulded-on connector.

### 6.9.2 Service Cord

**6.9.2.1** Flexible cords shall have a length between 1.7 m. and 2 m.

**6.9.2.2** The cable shall conform to IS:694 (Part I)-1964† except that the construction shall be as described below:

- a) Nominal cross-sectional area =  $0.5 \text{ mm}^2$
- b) Maximum dia of wires in conductor =  $0.07 \text{ mm}$
- c) Mean value of thickness of insulation =  $0.8 \text{ mm}$
- d) Average overall dimensions in mm:
  - 1) Lower limit =  $2.4 \times 4.8$
  - 2) Upper limit =  $2.9 \times 5.8$
- e) Minimum insulation resistance at  $60^\circ\text{C}$  =  $0.033 \text{ megohm/km}$
- f) Resistance of the conductor of length 1 000 m:
  - 1) for tinned wires =  $41 \Omega$
  - 2) for untinned wires =  $42.9 \Omega$

**6.9.2.3** The flexible cord shall be of the PVC insulated parallel twin type, that is, two conductors laid parallel and insulated simultaneously with PVC insulation.

**6.9.3 Cord Grip** — The provisions of **20.4.1** and **20.4.2** of IS:302-1967\* shall apply.

\*General and safety requirements for light electrical appliances (*third revision*).

†Specification for PVC insulated cables (for voltages up to 1 100 V): Part I With copper conductors (*revised*).

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**6.10 Terminals**—The provisions of 21 except that of 21.3(e) of IS: 302-1967\* shall apply.

**6.11 Screws and Connections**—The provisions of 23 of IS: 302-1967\* shall apply.

**7. PERFORMANCE REQUIREMENTS**

**7.1 Operation at Over and Under Voltages**—The shaver shall shave satisfactorily at the over and under voltages as specified below:

<i>Rated Voltage</i>	<i>Over Voltage</i>	<i>Under Voltage</i>
Single value	Rated voltage + 10 percent	Rated voltage — 10 percent
Range of voltage	Maximum voltage of the range + 10 percent	Minimum voltage of the range — 10 percent

NOTE—It is not possible, at present, to specify a test for efficiency of a shaver due to various factors.

**8. ENDURANCE**

**8.1** The shaver shall be so designed and constructed as to prevent in extended normal use any electrical or mechanical failure. In addition, the insulation shall not be damaged and contacts and connections shall not work loose due to heating, vibration, etc.

**9. MARKING**

**9.1** The provisions of 25 of IS: 302-1967\* shall apply.

**9.1.1** The shaver may also be marked with the ISI Certification Mark.

NOTE—The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act, and the Rules and Regulations made thereunder. Presence of this mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard, under a well-defined system of inspection, testing and quality control during production. This system, which is devised and supervised by ISI and operated by the producer, has the further safeguard that the products as actually marketed are continuously checked by ISI for conformity to the standard. Details of conditions, under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution

**10. TESTS**

**10.1 Categories of Tests**

**10.1.1 Type Tests**—The test specified in Table 1 shall constitute type tests and shall be carried out on five samples of the same model, type and ratings (selected preferably at random from a regular production lot).

\*General and safety requirements for light electrical appliances (third revision).

**TABLE 1 SCHEDULE OF TESTS**

(Clauses 10.1.1 and 10.3)

Sl. No.	TEST	CLAUSe REFERENCE
1	Visual examination and inspection	10.3.1
2	Cord grip	10.3.2
3	Withdrawal pull	10.3.3
4	High voltage	10.3.4
5	Insulation resistance (dry)	41.3 of IS: 302-1967*
6	Protection against electric shock	10.3.5
7	Leakage current	10.3.6
8	Moisture resistance	42 of IS: 302-1967*
9	Operation at over and under voltage	10.3.7
10	Temperature limit	10.3.8
11	Mechanical strength	10.3.9
12	Abnormal operation	10.3.10
13	Operation under overload condition	48.2 of IS: 302-1967*
14	Endurance	10.3.11
15	Screw and connections	33 }
16	Resistance to rusting	35 } of IS: 302-1967*
17	Fire resisting properties	29 }

\*General and safety requirements for light electrical appliances (third revision).

**10.1.1.1 Criteria of approval** — All samples shall successfully pass all the type tests for proving conformity with the requirements of the standard. Should any of the samples fail in any of the type tests, the testing authority at its discretion may call for fresh samples not exceeding twice the original number and subject them again to all tests or to the test(s) in which failure occurred. No single failure shall be permitted in the repeat test(s).

**10.1.2 Acceptance Tests** — The following shall constitute acceptance tests:

Test	Clause Reference
a) Visual examination and inspection	10.3.1
b) Test for protection against electric shock	10.3.5
c) High voltage test	41.1 }
d) Test for insulation resistance (dry)	41.3 } of IS: 302-1967*
e) Test for leakage current	10.3.6
f) Test for operation at over and under voltage	10.3.7
g) Test for moisture resistance	42 of IS: 302-1967*
h) Test for temperature limit	10.3.8

**10.1.2.1** A recommended sampling procedure for acceptance tests is specified in Appendix A.

\*General and safety requirements for light electrical appliances (third revision).

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### 10.1.3 Routine Tests — The following shall constitute routine tests:

<i>Test</i>	<i>Clause Reference</i>
a) Visual examination and inspection	10.3.1
b) Test for protection against electric shock	10.3.5
c) High voltage test	41.1
d) Test for insulation resistance (dry)	41.3
} of IS: 302-1967*	

NOTE 1 — High voltage test as a routine test may comprise the flash test specified in 41.2 of IS: 302-1967\*.

NOTE 2 — Insulation resistance (dry) test as routine test may be carried out without any conditioning.

**10.2 General Conditions for Tests** — Unless specified otherwise in the relevant clauses, the conditions specified in 26 of IS: 302-1967\* shall apply.

**10.3 Schedule of Tests** — Schedule of type tests to be carried out on the electric shaver for proving conformity with the requirements of this standard is given in Table 1 with suitable reference to relevant clauses of this standard and those of IS: 302-1967\*.

**10.3.1 Visual Examination and Inspection** — The shaver shall be visually examined and inspected for conformity with the relevant requirements specified in 4, 5, 6.1, 6.9, 6.10, 6.11 and 9.

**10.3.2 Cord Grip Test** — The flexible cord of a shaver not provided with an appliance coupler, when correctly fixed as in service, except that the conductors shall not be connected to the terminals, shall withstand a direct pull of 75N steadily applied without jerks for a period of one minute. The test shall be repeated twice, and the flexible cord shall not move noticeably in the cord grip. For a shaver with soldered or crimped terminations the conductors shall not be connected to the terminals during the test.

The above test shall also be applied to the grip of the flexible cord to the supply plug, when provided, and in the case of a detachable flexible cord to the connector. When the connection is moulded-on to the flexible cord the conductors need not be disconnected and in this case there shall be no interruption of the continuity of either conductor.

**10.3.3 Test for Withdrawal Pull** — Neglecting previous insertions and withdrawals the connector is inserted and withdrawn from the appliance-inlet 25 times. The pull necessary to withdraw the connector from the appliance-inlet during five further withdrawals shall not exceed 50N nor be less than 10N, any locking device is made inoperative. The connector shall be inserted and withdrawn from the appliance-inlet for further 65 operations and the pull necessary to withdraw the connector from the appliance-inlet for the next five withdrawals shall be not less than 10N when any locking device is made inoperative.

\*General and safety requirements for light electrical appliances (third revision).

**10.3.4 High Voltage Test**—This test shall be carried out in accordance with **41.1** of IS:302-1967\* after being operated under condition of normal load.

**10.3.5 Test for Protection Against Electric Shock**—Test shall be performed in accordance with **38** of IS:302-1967\*, with the exception that the accessibility test with a test pin shall be performed without the connector being removed in case of shavers with an appliance coupler.

**10.3.6 Test for Leakage Current**—This test shall be carried out in accordance with **40** of IS:302-1967\* after being operated under normal load conditions.

**10.3.7 Test for Operation at Over and Under Voltage**—The shaver shall be checked for compliance with the requirements of **7.1** by applying the voltages specified therein.

**10.3.8 Temperature Limit**—The test shall be carried out as specified in **39** of IS:302-1967\*. The shaver shall be run under normal load conditions.

**10.3.9 Mechanical Strength Test**—The provision of **34** of IS:302-1967\* shall apply with the modification that blows while impact testing are not to be applied to the cutting heads.

**10.3.10 Abnormal Operation Test**—The test shall be performed in accordance with **45.2** of IS:302-1967\* with the following modifications:

- a) In the test under clause **45.2(a)** the shaver should be connected for 30 seconds instead of 5 minutes.
- b) The tests under **45.2(b)** and (c) do not apply.
- c) In the test under **45.2(d)** the lowest possible load shall be achieved by removing parts which can be removed without use of tools.

**10.3.11 Endurance Test**—Shaver is operated at the voltage used for the test under **10.3.8** under the conditions of normal load. The period of operation is 10 minutes followed by the rest of 50 minutes. Five hundred such cycles of operation are performed continuously. After this test the shaver shall comply with the requirements of **50.3** of IS:302-1967\*.

## APPENDIX A

(Clause 10.1.2.1)

### SAMPLING PROCEDURE FOR ACCEPTANCE TESTS

#### A-1. LOT

**A-1.1** In any consignment, all electric shavers of the same make, model and

\*General and safety requirements for light electrical appliances (third revision)



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type and manufactured under similar conditions of production shall be grouped together to constitute a lot.

**A-2. SELECTION OF SAMPLES**

**A-2.1** From each lot a certain number of electric shavers, as prescribed in Table 2 shall be selected at random and subjected to acceptance tests specified in 10.1.2.

**A-2.2** The number of shavers to be selected shall depend upon the size of the lot and shall be in accordance with col 2 of Table 2.

**A-2.2.1** If required for repeat test(s) (see A-3.2), additional shavers as given in col 3 of Table 2 shall also be selected at random.

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**TABLE 2 SAMPLE SIZES AND CRITERION FOR CONFORMITY**

(Clauses A-2.1, A-2.2 and A-2.2.1)

LOT SIZE	FIRST SAMPLE	SECOND SAMPLE	ACCEPTANCE NUMBER	REJECTION NUMBER
	$N_1$	$N_2$	$C_1$	$C_2$
(1)	(2)	(3)	(4)	(5)
Up to 50	5	10	0	2
51 „ 100	7	14	0	2
101 „ 200	10	20	0	3
201 „ 300	13	26	0	3
301 „ 500	20	40	1	4
501 and above	25	50	1	5

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**A-3. CRITERION FOR CONFORMITY**

**A-3.1** The lot shall be considered as conforming to the requirements of acceptance tests if the number of failures in the first sample is less than or equal to acceptance number  $C_1$ , given in col 4 of Table 2. If the number of failures is greater than or equal to the rejection number  $C_2$  given in col 5 of Table 2, the lot shall be considered as not conforming to the requirements of the acceptance tests.

**A-3.2** If the number of failures is between  $C_1$  and  $C_2$ , a further sample of  $N_2$  shavers shall be selected and subjected to the acceptance tests. If the number of failures in the two samples combined is less than  $C_2$ , the lot shall be considered as conforming to the requirements of the acceptance tests otherwise not.

## INTERNATIONAL SYSTEM OF UNITS ( SI UNITS )

### Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

### Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

### Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s <sup>2</sup>
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m <sup>2</sup>
Frequency	hertz	Hz	1 Hz = 1 c/s (s <sup>-1</sup> )
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m <sup>2</sup>

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'Pushpak', Nurmohamed Shaikh Marg, Khanpur	AHMADABAD 380001	2 03 21
'F' Block, Unity Bldg, Narasimharaja Square	BANGALORE 560002	22 48 05
Gangotri Complex, Bhadbhada Road, T. T. Nagar	BHOPAL 462003	8 27 10
22E Kalpana Area	BHUBANESHWAR 751014	5 36 27
8-8-50C L. N. Gupta Marg	HYDERABAD 500061	22 10 63
R 14 Yudhister Marg, C Scheme	JAIPUR 302005	6 28 32
117/418 B Sarvodaya Nagar	KANPUR 208005	4 72 29
Patliputra Industrial Estate	PATNA 800013	6 28 08
Hantex Bldg (2nd Floor), Rly Station Road	TRIVANDRUM 695001	32 27

Printed at Simco Printing Press, Delhi, India